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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/566,241

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Tadahiro Ohmi

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EXAMINER

DHINGRA, RAKESH KUMAR

ART UNIT

PAPER NUMBER

1792

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/566,241	Applicant(s) OHMI ET AL.	
	Examiner RAKESH K. DHINGRA	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☒ Claim(s) 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 January 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>04/06/05/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

a) The drawings are objected to because:

1) Fig. 4 – Lead line for Reference number 51c (slot plate) does not point correctly to the slot plate (it is shown as pointing to the waveguide 51).

2) Figs. 12, 13 – Lead line for Reference numbers 64a, 64b (spacers) does not point correctly to the spacer (it is shown as pointing to the gas lines).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

b) The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

Figure – 13 – Reference number 77b (flat surface of the head) is not shown in the drawing (as mentioned at page 20, line 13 of the specification).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet,

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even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim 19 objected to because of the following informalities:

In line 3 – “am” may be corrected to “an”.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 10-14, 20-24, 30, 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Omi et al (JP 2001-093871).

Regarding Claims 1, 10, 11, 20, 21, 30, 31: Omi et al teach a microwave plasma CVD apparatus and method for manufacturing device in which a linear plasma is formed by using a microwave and an object to be processed is subjected to processing under substantially atmospheric pressure when the object 102 to be processed is being moved (through conveyor 104) while surface of the object 102 to be processed is maintained at horizontal position with respect to said linear plasma, wherein;

an H-plane slot antenna 400 is provided in a plasma head 103, slots of said H-plane slot antenna are being arranged alternately on both sides of a centerline of a waveguide with a pitch of $\lambda_g/2$ (λ_g : wavelength of the microwave within the waveguide), and a uniforming line 404 (equalization track) being provided with a distance from said slots to an emission end (slit 403) of said plasma head being set to $n \cdot \lambda_g/2$ (n an integral number) {e.g. Figs. 3, 4 and para. 0049-0060}.

Regarding Claims 2, 12, 22: Omi et al teach all limitations of the claim including the apparatus and method can also use E-plane slot antenna instead of H-plane slot antenna (para. 0058).

Regarding Claims 3, 13, 23: Omi et al teach all limitations of the claim including the uniforming line 404 made from high dielectric constant material like alumina (para. 0062).

Regarding Claims 4, 14, 24: Omi et al teach all limitations of the claim including the uniforming line 404 made from quartz, and that length of the uniforming line is selected (as a measure of waveguide wavelength λ_g) to control standing waves (para. 0062).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 5, 15, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Omi et al (JP 2001-093871) in view of Yoshiki et al (US 5,843,236).

Regarding Claims 5, 15: Omi et al teach all limitations of the claim as already explained above under claims 1, 11), but do not teach an absorbing material being attached to end of uniforming line.

Yoshiki et al teach a plasma apparatus comprising a rectangular waveguide 8 (uniforming line) with a terminating unit 9 having microwave absorber (water) at the end of waveguide (e.g.

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Fig. 40 and col. 2, lines 47-55). Further, the microwave absorber would obviously reduce the standing waves in the plasma head.

Therefore it would have been obvious to one of ordinary skills in the art at the time of the invention to provide a high dielectric strength microwave absorber disposed at the end of uniforming line as taught by Yoshiki et al in the apparatus of Omi et al to reduce standing waves in the plasma head.

Claim 6, 7, 16, 17, 26, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Omi et al (JP 2001-093871) in view of Paquet (US 5,985,378).

Regarding Claims 6, 16, 26: Omi et al teach all limitations of the claim as already explained above under claims 1, 11), including supply of a down flowing film forming gas to the surface of the object to be processed through gas inlets 300 and 301, but do not teach the gas is supplied through gas feeding nozzle provided in the plasma head.

Paquet teaches a microwave plasma apparatus comprising a microwave head 40 wherein a film forming gas is supplied in a laminar flow through a down flowing shower head (having small nozzles) down provided in the plasma head (e.g. Fig. 4 and col. 7, lines 3-60).

Therefore it would have been obvious to one of ordinary skills in the art at the time of the invention to provide a down flowing nozzles for supplying film forming gas as taught by Paquet in the apparatus of Omi et al to enable supply the gas in a uniform laminar flow over the surface of the object.

Regarding Claims 7, 17, 27: Paquet teaches side flowing gas nozzles in the plasma head (Fig. 2).

Claims 8, 9, 18, 19, 28, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Omi et al (JP 2001-093871) in view of Lee et al (US 5,968,275) and Hongo et al (US 2001/0050059).

Regarding Claims 8, 18, 28: Omi et al teach all limitations of the claim as already explained above under claims 1, 11), including shielding gas feeding pipe 501 that supplies a shield gas (nitrogen).

Omi et al do not teach a buffer plate being provided for carrying out uniform feeding of the shield gas into a plasma processing chamber on a downstream side of the shield gas feeding pipe another buffer plate for carrying out homogeneous exhaust of the gas is being provided on an exhaust side.

However use of a buffer plate to obtain uniform supply of gas is known in the art as per reference cited hereunder.

Lee et al teach a plasma apparatus with a plasma chamber, wherein a baffle plate 110 is provided and having holes through which nitrogen plasma is diffused for obtaining a uniform discharge of the gas plasma (e.g. Fig. 1 and col. 1, line 60 to col. 2, line 5). It would be obvious to provide the shield gas feeding pipe with a buffer (baffle) plate as per teaching of Lee et al to obtain uniform supply of shield gas in the plasma head.

Therefore it would have been obvious to one of ordinary skills in the art at the time of the invention to provide the shield gas pipe with a buffer plate as taught by Lee et al in the apparatus of Omi et al to obtain uniform supply of shield gas in the plasma head.

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Omi et al in view of Lee et al do not teach another buffer plate for carrying out homogeneous exhaust of the gas is being provided on an exhaust side.

Hongo et al teach a plasma apparatus with a processing chamber 102 and a baffle (buffer) plate provided near a susceptor 104 to maintain desired pressure in the process space and to prevent reverse flow from the exhaust space into the processing space (e.g. Fig. 1 and para. 0052).

Therefore it would have been obvious to one of ordinary skills in the art at the time of the invention to provide a buffer plate in the gas exhaust line as taught by Hongo et al in the apparatus of Omi et al in view of Lee et al to maintain desired pressure in the process space and to prevent reverse flow from the exhaust space into the processing space.

Regarding Claims 9, 19, 29: Omi et al teach that pressure P1 in said plasma processing chamber is set to a value lower than pressure P3 on the outermost periphery of said plasma head 103, and the pressure P3 is set to a value lower than the pressure P2 near the exhaust. It would be obvious to provide such pressure relationship with the exhaust baffle plate (another buffer plate) in the apparatus of Omi et al in view of Lee et al and Hongo et al for carrying out uniform homogeneous gas discharge exhaust, and that whereby the reverse flow of the gas from the said exhaust to the plasma head (Omi et al – Para. 0055).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAKESH K. DHINGRA whose telephone number is (571)272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rakesh K Dhingra/
Examiner, Art Unit 1792

/K. M./
Primary Examiner, Art Unit 1792